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Effect of Rehydration Fluid Osmolality on Plasma Volume and  
Vasopressin in Resting Dehydrated Men

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Greenleaf, J.E., G. Geelen, and L.C. Keil. Effect of rehydration fluid osmolality on plasma volume and vasopressin in resting dehydrated men. Am. J. Physiol. (Regulatory Integrative Comp. Physiol. 36):R0000-R0000, 1995. - Elevated plasma vasopressin concentration [PVP], which may act as a dipsogen, decreases promptly following the ingestion of fluids in many mammals including humans. The purpose for this study was to determine whether fluids of varied electrolyte and carbohydrate composition and osmolality [Osm] would modify post-drinking decreases in [PVP] which could be attributed to interaction with plasma volume (PV) or fluid-electrolyte interactive hormones. Five men (23-41 yr,  $78.0 \pm \text{SD } 8.2$  kg), water deprived for 24 h, drank six fluids (12 ml/kg, at  $16.5^{\circ}\text{C}$  in 4.0-6.2 min): water (30 mOsm/kg), NaCl (70 mOsm/kg), NaCl + NaCitrate (270 mOsm/kg), NaCl + 9.7% glucose (650 mOsm/kg), and two commercial drinks containing various ionic and carbohydrate contents (380 and 390 mOsm/kg). Blood (20 ml/sample) was drawn at -5 min before and at +3, +9, +15, +30, and +70 min after drinking. Heart rate, blood pressures, and plasma renin activity,  $[\text{Na}^+]$ ,  $[\text{K}^+]$ , [Osm], aldosterone, atrial natriuretic peptide, and epinephrine concentrations were unchanged after drinking. Post-drinking [PVP] decreased from 1.7 - 3.7 pg/ml within 3 min with all fluids independently of their composition, [Osm], or  $\Delta$  PV; with maximal depression to 0.1-0.7 pg/ml ( $p < 0.05$ ) by 15 min. The continued [PVP] depression with all fluids from 15 to 70 min was accompanied by unchanged plasma [Osm] but 1.8-7.6% increases ( $p < 0.05$ ) in PV with 3 fluids (2 commercial and NaCitrate) and no change with the others. Percent changes in mean [PVP] and plasma norepinephrine concentrations [PNE] at 15 min correlated -0.70

( $p < 0.10$ ) suggesting that about half the variability in [PVP] depression was associated with [PNE]. Thus, part of the mechanism for post-drinking [PVP] depression may involve a drinking stimulated nor-epinephrine (neural) factor.

**KEY WORDS:** Drinking, renin activity, aldosterone, atrial natriuretic peptide, catecholamines